

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number  
**WO 2004/029365 A1**

(51) International Patent Classification<sup>7</sup>: E01F 9/03, 9/06

(21) International Application Number:

PCT/US2003/026011

(22) International Filing Date: 21 August 2003 (21.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

2002-277175 24 September 2002 (24.09.2002) JP

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55133-3427 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT (util-  
ity model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,  
CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (util-  
ity model), DE, DK (utility model), DK, DM, DZ, EC, EE  
(utility model), EE, ES, FI (utility model), FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,  
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO,  
RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ,  
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,  
ZM, ZW.

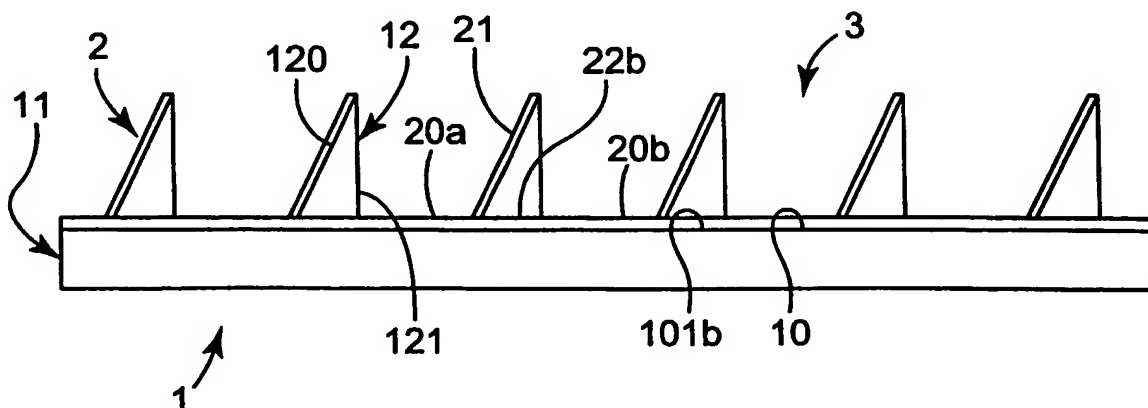
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: REFLECTOR



(57) Abstract: There is provided a reflector capable of reflecting light at a wide angle of incidence, for which the manufacturing time can be easily shortened even if a comparatively hard reflection sheet is used and of which the reflection sheet is effectively prevented from being cracked or peeled from the supporting body. A reflector comprising: a supporting body (1) which has a base (11) and a plurality of projections (12) having a sloping surface (120), and a reflection sheet (2) disposed on the surface of the base and sloping sections (120) of the projections (12); wherein the length of the surface (10) between the projections in the direction of width is larger than the length of the projection in the direction of width, and the surface of the base (1) has at least one peripheral surface (101b) of each projection (12) extending along the periphery of the direction of width of the projections (12) at each of the projections (12); and the reflection sheet (2) further includes a peripheral section (22b) disposed on the peripheral surface (101b) of each projection, and the sloping section (21) of the reflection sheet (2) is linked with one (20a) of the two adjacent sections (20a, 20b) between the projections (12) and separated from the other section (20b) and the peripheral section (22b) of the projection.

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A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 E01F9/03 E01F9/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 E01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01 01172 A (3M INNOVATIVE PROPERTIES CO) 4 January 2001 (2001-01-04) page 6, line 11 - line 22 page 12, line 8 -page 14, line 16; figures 1-3	1,5
A	WO 99 04095 A (MINNESOTA MINING & MFG) 28 January 1999 (1999-01-28) page 3, line 29 -page 4, line 5; figure 3	1
A	US 5 975 706 A (NAKAYAMA NAOKI) 2 November 1999 (1999-11-02) column 2, line 64 -column 3, line 64; figure 1	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the International search

16 December 2003

Date of mailing of the International search report

22/12/2003

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p data-bbox="298 254 954 407">FR 2 678 963 A (SKRZYPCZAK FRANCOIS) 15 January 1993 (1993-01-15) page 6, line 27 -page 7, line 9 page 7, line 24 -page 8, line 8; figures 4,8,9</p> <p data-bbox="607 415 691 428">-----</p>	1

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/26011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0101172	A	04-01-2001	JP 2001003324 A	09-01-2001
			AU 5758400 A	31-01-2001
			BR 0011895 A	02-04-2002
			CA 2377022 A1	04-01-2001
			CN 1358277 T	10-07-2002
			EP 1190267 A1	27-03-2002
			NO 20016287 A	25-02-2002
			WO 0101172 A1	04-01-2001
			US 6517923 B1	11-02-2003
WO 9904095	A	28-01-1999	AU 7819698 A	10-02-1999
			WO 9904095 A1	28-01-1999
US 5975706	A	02-11-1999	AU 725377 B2	12-10-2000
			AU 6591898 A	22-10-1998
			CN 1251631 T	26-04-2000
			DE 69809206 D1	12-12-2002
			DE 69809206 T2	20-03-2003
			EP 0972112 A1	19-01-2000
			JP 10333616 A	18-12-1998
			WO 9844202 A1	08-10-1998
FR 2678963	A	15-01-1993	FR 2678963 A1	15-01-1993
			CA 2113267 A1	21-01-1993
			EP 0594637 A1	04-05-1994
			WO 9301357 A1	21-01-1993
			JP 7500388 T	12-01-1995

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